



Rev. 10/93

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT

11-29-03  
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IN THE APPLICATION OF:

**JEFFREY ALAN HANKS**

CASE NO.: **KB4495 US NA**

APPLICATION NO.: **09/977,648**

GROUP ART UNIT: **3635**

FILED: **OCTOBER 15, 2001**

EXAMINER: **STEVE M. VARNER**

FOR: **FIBER REINFORCED COMPOSITE SHEATHING FOR STORM  
PROTECTION**

**DECLARATION**

Assistant Commissioner for Patents  
Washington, D.C. 20231

**RECEIVED**

**NOV 24 2003**

**GROUP 3600**

Sir:

I, Jeffrey A. Hanks, hereby declare:

**That** I hold a Bachelor of Science degree in Mechanical Engineering from the University of Delaware (1983) and a Masters of Science Degree in Mechanical Engineering from Virginia Polytechnic Institute and State University (1988).

**That** presently I am a senior research engineer of the Advanced Fiber Systems of E. I. du Pont de Nemours and Company, and for the last five years have focused my research efforts in the application of high strength fibers including the application in the reinforcement of buildings and building related structures.

**That** I am the inventor of patent application Serial No. 09/977,648 filed October 5, 2001.

**That** I have read and reviewed an Office rejection dated July 9, 2003 in Serial No. 09/977, 648.

**That** I note the Office rejection rejects all claims based on a combination of Simpson USP 4,822,657 and Green USP 5,733,643.

**That** I note the following conclusions in the Office rejection:

It would have been obvious to one of ordinary skill in the art at the time the present invention was made to have high strength fibers bonded with a resin as in Green in the fabric of Simpson to increase the strength of the panel.

...

It would have been obvious to one of ordinary skill in the art at the time the present invention was made to use polyethylene, aramid, and glass fibers as in Green in the structure of Simpson to strengthen the fabric.

...

Regarding claims 9-10, the integral portion used for a wall or a ceiling are obvious design choices to put the panel in places it would be useful.

**That** I disagree with the conclusions in the Office Action.

#### **UNEXPECTED RESULTS**

**That** I consider that unexpected results are present in accordance with the teachings of the present patent application.

**That** as support of unexpected results, I consider prior to my invention a high strength fabric layer attached to a wall structure of structural sheathing (such as plywood) has been unable to withstand a 15 pound (33 kilogram) 2x4 missile (i.e., a nominal size 2 inch x 4 inch wood stand) propelled at a speed of 100 miles (161 kilometers) per hour in accordance with the test procedure set forth in my patent application.

**That** I consider that prior art wall structures employing a high strength fabric layer would fail under the above noted test conditions due to either excessive deflection of the high strength fabric during impact or failure of framing holding the high strength fabric in place unless an excessive number of fabric layers were present.

**That** I consider as further evidence of unexpected results that criticality is present in the mounting of a combination of my disclosed high strength fabric with resin deflecting in a range of 5.0 to 17.5 centimeters employing the 15 pound missile at a speed of 100 miles per hour.

**That** success or failure results for a composite of high strength fabric/resin with the recited deflection due to the positioning of the composites either facing or not facing the 15 pound missile.

**That** such success or failure is as follows:

- (a) when mounted in a building structure it is necessary for the structural sheathing (such as one half inch plywood) to FACE THE 15 POUND PROJECTILE such that the projectile impacts the structural sheathing before striking the composite of high strength fabric with resin having the recited deflection and
- (b) when mounted in a building structure failure occurs with the composite of high strength fabric with resin having the recited deflection FACING THE 15 POUND PROJECTILE such that the projectile impacts the high strength fabric with resin before striking the structural sheathing.

**That** I direct attention to part (b) of the previous paragraph that solely with on reversal of the composite (i.e., the high strength resin fabric facing the 15 pound projectile) which typically results in a hole completely through the composite wherein punching and tearing of the high strength fabric with resin occurs near the vicinity of impact by the projectile, followed by punching and splitting of the structural sheathing behind allowing the projectile to penetrate the building structure.

**That** to summarize the previous paragraphs the composite of the present patent application when positioned in a building structure in accordance with the teachings of the present patent application results in success in deflecting a 15 pound projectile at 100 miles per hour but results in failure with the same composite reversed with a hole in the composite.

**That** as further evidence of unexpected results as viewed by personnel at the Wind Engineering Research Center (WERC) at Texas Technical University, Lubbock, Texas (WERC is the only known research institute know by myself having a dedicated cannon to fire projectiles such as a 15 pound 2x4 projectile at 100 miles per hour) expressed surprise to see success of my lightweight composite when they had not seen this success in wall systems with similar weight characteristics and had not seen wood framed, metal or concrete systems reflect the projectile backward with such intensity.

#### **COMMERCIAL SUITABILITY**

**That** commercial suitability of the invention disclosed in my patent application is present since my employer, E. I. du Pont de Nemours and Company, has begun commercially marketing the composite disclosed in my patent application for use in building structures to withstand debris from tornado force winds.

#### **OFFICE REJECTIONS**

**That** I consider Simpson USP 4,822,657 applied in the Office rejection to be non-analogous art since the patent disclosure is directed to “resisting the impact force of bullets and similar projectiles” since the mass of a bullet or similar projectiles totally differs from the mass of a 15 pound projectile at a speed of 100 miles per hour.

**That** I consider Green USP 5,733,643 applied in the Office rejection to be non-analogous art since the patent disclosure is directed to resisting “impact and penetration from an object or projectile including bullets, fragments from explosions, sharp instruments such as knives, ice picks and the like and blunt instruments such as bats, hammers, iron bars and the like” since the combination of mass and projectile speed of this publication totally differs from the mass of a 15 pound projectile as a speed of 100 miles per hour.

**That** I consider the reliance of the Office rejection to combine Simpson USP 4,822,657 and Green USP 5,733,642 to be unsupported to anticipate the invention disclosed (and claimed) in my patent application.

**That** I consider such structure, EVEN IF THE HIGH STRENGTH MATERIAL OF SIMPSON WERE BONDED, to be unsatisfactory and not lead to my invention for a number of reasons:

(a) the statement in the Office action "to increase the strength of the panel" in Simpson inherently would lead to **increased rigidity within the panel**; yet in my invention **flexibility is of paramount importance** under the test conditions of a 15 pound (33 kilogram) projectile at a speed of 100 miles (161 kilometers) initially striking structural sheathing (such as plywood) results allowing my high strength fabric to **deflect** in a range of 5.0 to 17.5 centimeters **with the projectile bouncing in an opposite direction from the direction of impact**.


(b) the Office position does not take into account the disclosure of Simpson on column 4, line 14 to 16 which states:

*The number of fabric layers and thickness of the fabric layer 33 may be varied depending upon the level of protection desired.*

since such disclosure does not allow one to derive my invention; illustratively the examples in my patent application employ an extremely thin layer of Kevlar® aramid of 0.060-inches thick, consistent with a need for flexibility in contrast to a number and presumably thick layers for increased strength in Simpson if modified consistent with the Office position.

(c) for the reasons stated in part (a and b), I consider that there is no teaching which would allow one in the art to derive my invention from a modification of Simpson including my result never achieved before in a lightweight composite.

**That** I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

  
JEFFREY A. HANKS

Date: November 5, 2003